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OLEFIN-BASED RESIN COMPOSITION
[Orefin kei jushi soseibutsu]

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Claims

1. An olefin-based resin composition with excellent moldability comprising 5-50 wt% of a low-density polyethylene having a melt index in the range of 0.1-3.0 g/10 min and 95-50 wt% of a linear low-density polyethylene.

2. The olefin-based resin composition with excellent moldability described in Claim 1 of the invention characterized by being suitable for inflation molding.

Detailed explanation of the invention

The present invention pertains to an olefin-based resin composition having excellent moldability.

In recent years, a so-called "third polyethylene," a linear low-density polyethylene having superior mechanical properties compared to those of conventional low-density polyethylenes, has been developed in the United States. Films may be formed by standard film formation methods, for example, inflation molding or T-die molding, according to the various applications.

However, the strength of the aforementioned linear low-density polyethylene when molten is not increased and sagging of the resin is likely to occur during film formation by inflation molding, and as a result, stable film formation is difficult, and films with a large thickness or a high inflation ratio cannot be formed.

As a result of much research conducted by the inventors of the present application discovered that the above problems could be solved when a specific low-density polyethylene and a specific linear low-density polyethylene were used in combination, and as a result, the present invention was accomplished. The target of the present invention is an olefin-based resin composition with excellent moldability comprising 5-50 wt% of a low-density polyethylene having a melt index in the range of 0.1-3.0 g/10 min and 95-50 wt% of a linear low-density polyethylene.

The low-density polyethylene used in the present invention has a melt index (hereinafter referred to as MI) in the range of 0.1-3.0 g/10 min. When the MI of the aforementioned low-density polyethylene is 3.0 g/10 min or greater, the strength of the molten mixed resin and a linear low-density polyethylene is not improved, and sagging of the resin during molding remains unsolved. As a result, formation of films with large thickness or a high inflation ratio cannot be achieved. On the other hand, when the MI is 0.1 g/10 min or less, affinity with the linear low-density polyethylene in the extruder becomes inferior and drawing while molten is difficult. This results in problems such as rupturing of the film during film formation by the inflation method. Furthermore, the films obtained are likely to tear because of reduced strength.

Furthermore, the linear low-density polyethylene (hereinafter referred to as L-LDPE) used in the present invention is not especially limited and those having an MI in the range of 0.5-5.0 g/10 min and density in the range of 0.925-0.93 and commonly used for inflation films and T-die films may be used.

The mixing ratios of the resin composition of the present invention is 5-50 wt% of the aforementioned low-density polyethylene with an MI in the range of 0.1-3.0 g/10 min and 95-50 wt% of L-LDPE. When the mixing ratio of the aforementioned low-density polyethylene is 50 wt% or greater, the film cannot have excellent mechanical properties such as high strength, high elongation and high impact resistance unique to L-LDPE; on the other hand, when the mixing ratio of the low-density polyethylene is 5 wt% or less, the strength of the molten mixed resin and L-LDPE cannot be improved, and sagging of the resin during molding remains unsolved, and as a result, stable moldability is not possible.

As explained above, the olefin-based resin composition of the present invention comprises 5-50 wt% of a specific low-density polyethylene and 95-50 wt% of L-LDPE. Due to this, the strength of the aforementioned resin composition can be increased when molten, sagging of the resin during molding

can be eliminated, and stable formation of films with a large thickness or a high inflation ratio is possible, which has not been possible when an L-LDPE alone is used due to the lack of good moldability.

The olefin-based resin composition of the present invention is especially suitable for use in inflation molding.

The present invention is explained in further detail with the following application examples.

Application Example 1

A resin mixture comprising 10 wt% of low-density polyethylene with an MI of 0.5 g/10 min and a density of 0.922 g/cc and 90 wt% of L-LDPE with an MI of 2.3 g/10 min and density of 0.929 g/cc was extrusion molded based on the inflation method with a molding machine having the specifications shown in Table 1 below. The molding conditions were a molding temperature of 180 °C, extrusion rate of 30 kg/h and inflation ratio of 1.5.

TABLE 1

① 装置仕様		
② 押出機	③ スクリュー径	55㎜φ
	④ スクリューL/D	24
⑤ インフレーションダイ	⑥ 形式	⑦ スパイラル
	⑧ 口径	150㎜φ
	⑨ クリアランス	1.0㎜
⑩ 冷却方式		⑪ 空冷

Key: 1 Equipment specifications

2 Extruder

3 Screw diameter

4	Screw L/D
5	Inflation dye
6	Format
7	Spiral
8	Aperture
9	Clearance
10	Cleaning system
11	Air cooling system

In this case, sagging of the resin during the molding process was not observed and stable formation of a film with a thickness of 170 μ was made possible. The film obtained as explained above had excellent tensile strength as well as high impact resistance.

Application Example 2

A resin mixture comprising 30 wt% of low-density polyethylene with an MI of 3.0 g/10 min and density of 0.924 g/cc and 70 wt% of L-LDPE with an MI of 2.3 g/10 min and density of 0.929 g/cc was extrusion molded based on the inflation method as described in Application Example 1. In this case, sagging of the resin during molding was not observed and stable formation of a film with a thickness of 170 μ was possible. The film obtained as explained above had excellent tensile strength as well as high impact resistance.

Comparative Example 1

An L-LDPE with an MI of 2.3 g/10 min and density of 0.929 g/cc alone was extrusion molded based on the inflation method as described in Application Example 1. In this case, molding was not possible because of sagging of the resin.

Comparative Example 2

A resin mixture comprising 70 wt% of low-density polyethylene with an MI of 2.5 g/10 min and density of 0.928 g/cc and 30 wt% of L-LDPE with an MI of 2.5 g/10 min and density of 0.922 g/cc was extrusion molded based on the inflation method as described in Application Example 1. In this case, both the tensile strength and the impact resistance of the obtained film were inferior.

Amendments requested

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Amendment of Proceedings (Amendment)

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To: The Commissioner of the Japanese Patent Office

Case Identification

Patent Application No. 14693 S56 (1981)

Title of the Invention

Olefin-based Resin Composition

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5. Parts Amended

Title of the invention in the specification, claims of the invention and detailed explanation of the invention.

6. Contents of the Amendment

(1) "An olefin-based resin composition with excellent moldability" in the title of the specification is amended to "olefin-based resin composition."

(2) The claims of the invention in the specification are amended as described in the attachment.

(3) "olefin-based resin composition with excellent moldability" in lines 5-6 from the bottom of page 2 of the specification is amended to "olefin-based resin composition."

7. List of Attachments

(1) Document describing the claims of the invention 1 copy

Claims of the Invention

1. An olefin-based resin composition of 5-50 wt% of a low-density polyethylene having a melt index in the range of 0.1-2.0 g/10 min and 95-50 wt% of a linear low-density polyethylene.

2. The olefin-based resin composition described in Claim 1 of the invention characterized by being suitable for inflation molding.